LVDT SIGNAL CONDITIONER — NE5520

DESCRIPTION

The NE5520 is a signal conditioning circuit for use with Linear Variable Differential Transformers (LVDT). The chip includes a low distortion amplitude stable sine wave oscillator with programmable frequency to drive the primary of the LVDT; a synchronous demodulator to convert the LVDT output amplitude and phase to position information; and an output amp to provide gain and filtering.

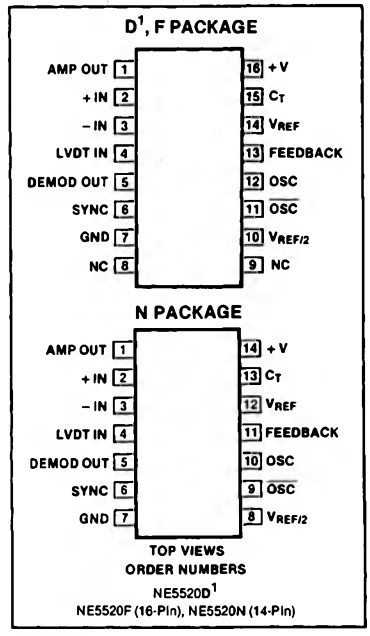
FEATURES

- **Oscillator frequency: 1kHz to 20kHz**
- **Low distortion**
- **Capable of ratiometric operation**
- **Single supply operation 5V to 20V or dual supply ±2.5V to ±10V**
- **Low power consumption**

APPLICATIONS

- **LVDT signal conditioning**
- **RVDT signal conditioning**

PIN CONFIGURATION

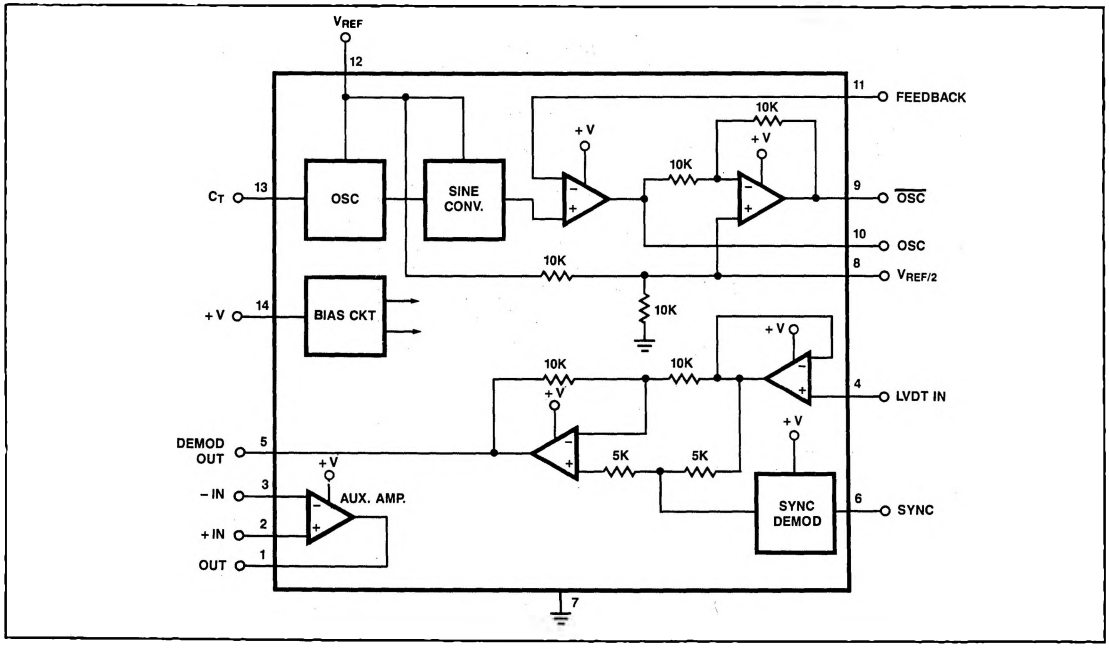


NOTES:
1. SOL - Released in Large SO package only.
2. SOL and non-standard pinout.
3. SO and non-standard pinouts.

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Supply voltage	+20	V
Split supply voltage	±10	V
Operating temperature range	0 to +70	°C
Storage temperature range	−65 to +165	°C
Power Dissipation (Note 1)	840	mW

BLOCK DIAGRAM



NOTES:
1. Supplied only in large SO (Small Outline) package. See package diagram.
2. Pin numbers are for N package.

LVDT SIGNAL CONDITIONER — NE5520

DC ELECTRICAL CHARACTERISTICS $T_A = 25°C$, $V_R = V+ = 10V$ unless otherwise specified.

PARAMETER	TEST CONDITIONS	NE5520			UNIT
		Min	Typ	Max	
Supply current	Over temp.		7.0	10	mA
Reference current	Over temp.		5.5	10	mA
Reference voltage range	Over temp.	5		V+	V
Power dissipation			120	220	mW
Oscillator section					
Oscillator output			$\frac{V_R}{8.7}$		Vrms
Sine wave distortion			4		%
Initial amplitude error				± 3	%
Tempco of amplitude				0.05	%/°C
Voltage coef. of amplitude error				2.5	%/V
Initial accuracy of osc. frequency				20	%
Tempco of frequency error			0.05		%/°C
Voltage coef. of frequency			2.5		%/V (V_R)
Oscillator output load current	Over temp.	8	15		mA (rms) mA (rms)
Demodulator section					
Linearity error	Over temp.		0.05	0.1	%
Maximum demodulator input	Over temp. range	$\frac{V_R}{2} - 0.5$		$\frac{V_R}{2} + 0.5$	V
Demodulator offset voltage	Over temp. range			65	mV
Demodulator input current	Over temp.	– 1000	– 300		nA
$V_R/2$ accuracy	Over temp.	– 3	± 0.5	+ 3	%
Auxiliary Output Amplifier					
Input offset voltage	Over temp.	– 10		10	mV
Input bias current	Over temp. range	– 500	– 300		nA
Input offset current		– 100		100	nA
Gain	$R_L = 10k\Omega$ over temp.		100		V/mV
Slew rate			1.5		V/μsec
Gain bandwidth	$A_v = 1$		1		MHz
Output voltage swing	$R_L = 10K$ over temp.	1.5		V+ –1.5	V
Output short circuit current			50		mA

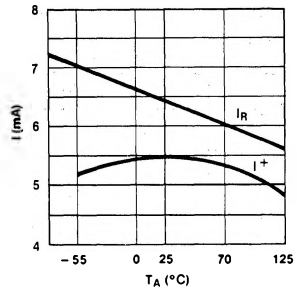
NOTE
Rating applies to ambient temperatures up to 70°C. Above 70°C derate linearly at 7.6mW/°C for the plastic package and 7.3mW/°C for the cerdip package.

LVDT SIGNAL CONDITIONER

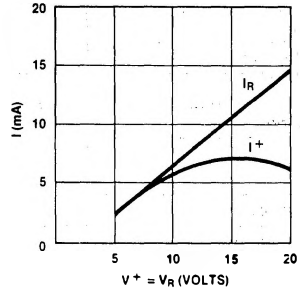
NE5520

TYPICAL PERFORMANCE CHARACTERISTICS

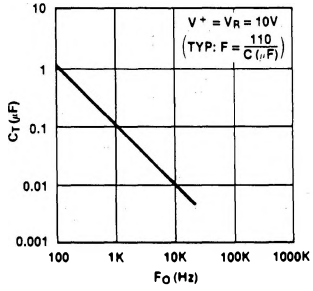
I_R AND I^+ vs TEMPERATURE



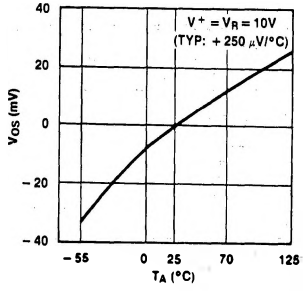
I_R AND I^+ vs VOLTAGE



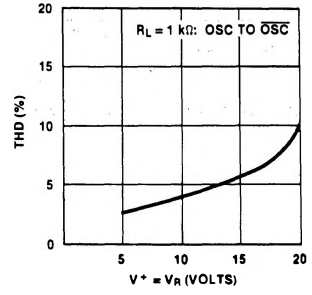
F_O vs C_T



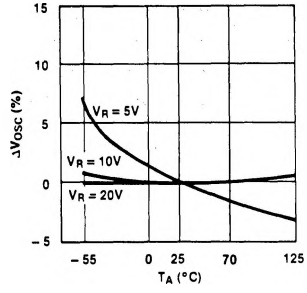
DEMODULATOR OFFSET vs TEMPERATURE (NORMALIZED TO 25°C)



DISTORTION OF SINE WAVE vs REFERENCE VOLTAGE



OSCILLATOR AMPLITUDE VARIATION WITH TEMPERATURE



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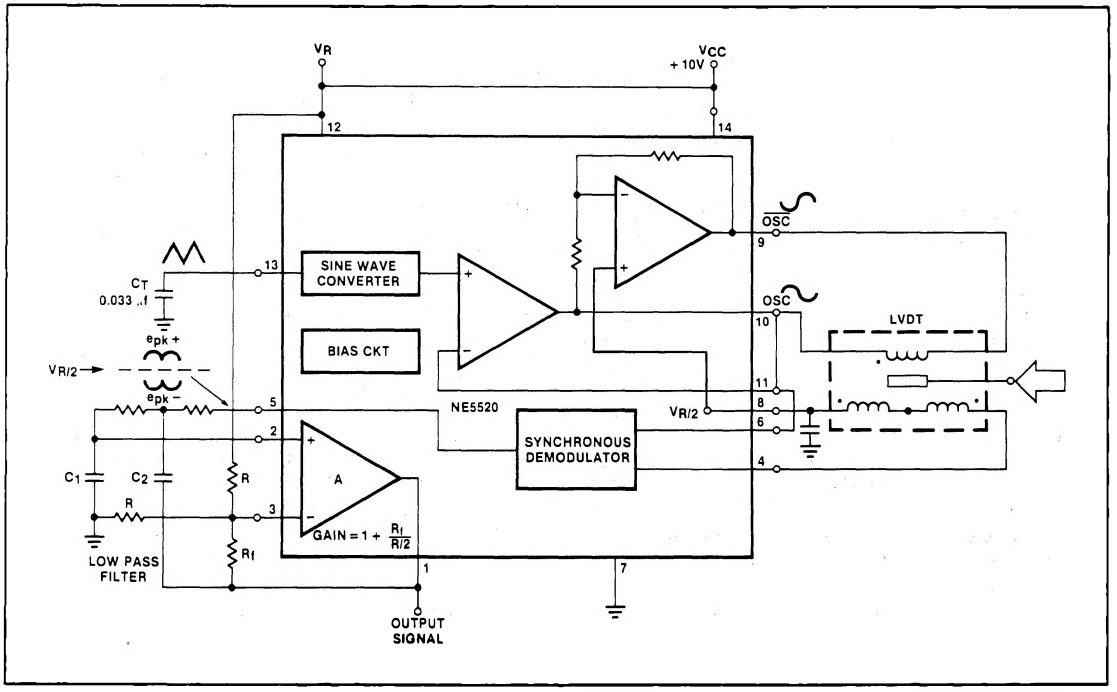
TYPICAL SINGLE SUPPLY LVDT CIRCUIT



For additional information, refer to the Applications Section.